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THE DIFFERENTIAL IMPACT OF GROWTH POLICY ON THE SMALL FARMER OF SOUTHERN BRAZIL

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The Differential Impact of Growth Policy on the Small Farmer of Southern Brazil.**

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There are many perspectives from which to view small farmer development problems. Economic growth at the farm level characteristically involves some combination of technological change and capital formation. Technological change may take one of several forms, ie. capital saving, labor saving, scale specific, etc. In almost all cases, significant improvements in output require additional capital inputs. The rural institutional system within which growth takes place may have an important bearing on the nature of technological change and the manner in which it is facilitated. Public policies that alter factor and/or product price relationships or remove capital constraints also have an important role in determining the speed and direction of the growth process. The interaction of these three forces; the nature of technology, the institutional system and public policy, can result in a substantially different growth impact on specific farmer groups. This is especially true for small farmers in rural societies that include significant portions of both small and large farms. In this situation the small farmer is frequently left behind during periods of significant growth.

Adams and Coward [1] concluded that small farmers have generally not shared equally in the substantial growth that has occurred recently in many less developed countries. Development problems were considered more

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complex in a bimodal than in a unimodal society.[1/] Few instances of significant improvement for small farmers were noted and in general, growth stimulating programs further deteriorated the relative position of the small farmer in a bimodal society.

This paper focuses on the impact of growth policies on the small farmer in the generally bimodal farm structure of Southern Brazil. The farm structure of southern Brazil however presents a unique opportunity to further dissect the small farmer problem into inter and intra sub-regional comparisons. That is, within the sector both unimdal small farm regions and bimodal farm regions can be delineated. Each region is sufficiently large and distinct to allow somewhat different paths of development to occur in response to the same general policies. This allows the comparison of policy impact between small farms in the unimodal and bimodal regions as well as between small and large farms in the bimodal region, and consequently the identification of specific policy programs not only for small farmers in general but for the particular system in which they are found.

Systems for classifying and studying small farmer situations and associated programs were suggested by the above mentioned seminar. The first system based on a paper by Gotch [3] suggested that small farmers should be studied within the context of surrounding economic and political processes. A systems approach was suggested that included "(1) the nature of the available technology, with particular reference to its scale effects; (2) the distribution of land holdings by size, (3) the distribution of

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1/ The term unimodal was used to characterize a system in which farm size was uniform and institutional services and technology were evenly distributed. Bimodal represented a skewed distribution of land holdings, with associated economic and political power concentrated in the hands of large land owners. A related but somewhat different interpretation of of the terms "bimodal" and "unimodal" is used by Kilby and Johnston [4] in their reference to development strategies. In the context of their usage a bimodal strategy is restricted to modernization of the large-scale mechanized subsector where as a "unimodal" strategy is "aimed at the progressive modernization of the bulk of the nations cultivators."

income and social power and (4) the distribution of institutional services."

A second classification system described the nature of development programs for small farmers. Three forms were identified. (1) An integrated approach which simultaneously provides a number of needed services, Mosher [7]. (2) A non-integrated approach which stresses only selected services or activities. (3) A filter down approach that utilizes national agricultural development policy tools with little or no specific programs for small farmers. These are useful classification criteria for characterizing the regions and programs studied in southern Brazil, and will be followed in this paper, both as a means of linking the farm systems and policy programs as well as a further test of the appropriateness of the classification suggested by the seminar.

This paper then has three general objectives:

1) to test the appropriateness of the above small farmer classification systems in understanding the impact of growth policies on small farmers.

2) to describe the intra and inter sub-regional growth patterns on farms in a small farm unimodal and in a bimodal system.

3) to suggest policy changes that will lead to more satisfactory results.

The discussion begins with a description of policies, technology and farming and institutional situations in the two sub-regions. This is followed by an analysis and comparison of farm level data from each sub-region. A final section examines the policy implications.

The small farm systems

The unimodal small farm sub-region of southern Brazil occupies several distinct locations in the three states of Rio Grande do Sul, Santa Catarina and Parana. Geographically, it is located within the costal mountain range and in strongly undulating terrain on an interior plateau. The small farmers

follow a pattern of mixed farming, with corn and hogs as the principal crop and livestock enterprises. The majority of the farms and farm people of southern Brazil are found in the unimodal region. Size of farm will vary somewhat, however, farms are generally within the 10-20 hectare range, few exceed 50 hectares in size. Sample data were collected from three counties in this area; Lajeado in the state of Rio Grande do Sul and Concordia and Timbo in the state of Santa Catarina.[2/]

Bimodal size distributions with significant numbers of both small and large farms do not exist in as clearly defined a sub-region as the unimodal small farm area. Generally, they are located around the periphery of the small farm area and thus represent a transition between the small and large farm regions. The particular area selected for sampling is located on the central plateau in the state of Rio Grande do Sul and is represented by the two counties of Nao-Me-Toque and Carazinho. The terrain is undulating, though less than the small farm region. Smaller farms are principally crop farms, the large farms until recently specialized in grazing cattle. Mechanized wheat and soybean production has become increasingly important in recent years, and represents both the focus of public policy and the source of a recent surge in development in this region.

A special subsample of three farm groups relatively homogenous in farm size and type were selected for the analysis. Crop farms were selected as representing the most homogenous resource base from which to view the impact of general policy on each farm group. Crop farms were defined as those with 25 percent or more of agricultural land (cropland plus pasture) in crops and a majority of farm cash receipts coming from crop sales.

2/ A more complete area description can be found in [11].

Small farms of less than 20 hectares of agricultural land were selected from each region and large farms of 50-199.9 hectares were selected from the bimodal region.

Many forms of modern technology are available and used in southern Brazil. Chemical and biological technology are generally available in the form of fertilizer, insecticides and herbicides. Mechanical technology, especially in the bimodal area is commonly used. Development of mechanical technology, however, has been principally in large scale equipment and power sources. Small farmers, thus, find it difficult to acquire the services of mechanical technology, except on a rental basis. Lack of development of high yielding varieties and associated fertility management are the weakest links in the technology package. Recent research has suggested a "technological barrier" is severely limiting additional growth in output in this area [5, 8, 13].

The distribution of institutional services, presents an interesting contrast. Most communities in both regions possess extension, credit and input services. Supply and product facilities, however, are more developed and competitive in the bimodal region, where the recent surge of development has caused an increase in the number and volume of business of these service institutions. In the process they have lowered the cost of some services and provided additional services to farmers [6]. In both regions the institutional lenders generally identify more closely with the larger farmers.

Agricultural policy in southern Brazil can be considered as basically a filter down approach. An expanded supply of low interest rate agricultural credit is a major component of this policy. High support prices and special production credit for wheat focus on the stimulation of domestic wheat production. Special credit terms for acquiring machinery stimulate mechani-

zation and thus favor large farmers. On the other hand, maximum loan levels for individual farmers and special incentives for broad private bank participation in agricultural credit are attempts to spread the credit among all farmer groups. Research has suggested, however, that low interest rate policy may actually work to the disadvantage of the small farmer by making small loans unprofitable for the banks and increasing the demand for credit generally [2]. This results in much of the increased credit going to larger farmers.

Within this size, technology, institutional and policy framework, several of the factors suggested earlier by Gotch [3] can be identified as potentially contributing to differential rates of growth. A combination of mechanical technology which includes economies of scale, special credit services and more economically efficient service institutions could result in generally lower cost and easier access to technological inputs in the bimodal region. On the other hand low interest rate policy should stimulate the demand for credit by all farmer groups, while on the credit supply side, cost of service, supply of funds and banker preference are the factors that will ultimately determine whether "equitable" distribution occurs. Guaranteed price levels on wheat should have a positive effect across regions in reducing price uncertainties.

Some caution must be exercised in making direct comparisons between regions since it is possible that farmers in each region may face somewhat different production surfaces due to land quality and climatic differences. This combined with the price differences may make a direct comparison of input levels less meaningful. On the other hand, climate and soil conditions are generally thought to be superior in the unimodal region, thus mitigating somewhat the price advantage in the bimodal area. These are testable

hypotheses, and while not included in the present paper are subjects of future research.

In the next section farm level data is presented (1) to examine the difference in use of inputs, levels of output and use of credit on the crop farms in both regions and (2) to observe the investments made in capital items (land, buildings, improvements, and machinery) over a five year period of general economic growth in the agriculture of southern Brazil.

Capital composition and use

Average farm data on investment, operating expense and income measures for the 1969 calendar year are presented for each farm group in Table 1. To facilitate capital use intensity comparisons these data are expressed on a per cultivated hectare basis in Table 2. Although the small farms in each region are similar in size and enterprise, there are substantial differences in the composition of investment capital and input use. Actually, the small farms in the bimodal area more closely approximate the neighboring large farms in intensity of use of cpaital items. Machinery investment per hectare is quite similar for both size groups in the bimodal region and more than twice as great as for small farms in the unimodal area. The same can be said for machinery operating expenses and total expenditures in general. Crop expenses represent the greatest difference among the three farm groups. Small farms in the bimodal region used more than five times as much crop inputs per hectare as small farms in the unimodal region. Large farms, however used even more (nine times). The other major difference in capital use appears in the item of custom hire. The much greater use of custom hire by small farms in the bimodal region indicates that some use of machinery for critical farm operations did filter down to the small farms.

Table 1

Selected Characteristics of 225 Specialized Crop Farms
By Farm Size and Region - Southern Brazil - 1969

Characteristic	Unimodal Small Farm Region (0-19.9 hectares)	Bimodal Farm Size Region	
		Small Farms (0-19.9 ha)	Large Farms (50-199.9 ha)
Number of observations	109	36	80
Land Use (hectares)		(average per farm)	
Total hectares operated	21.3	17.4	115.4
Agricultural land	10.2	11.9	99.7
Cultivated	7.5	9.4	88.9
Pasture	2.7	2.5	10.8
Livestock and machinery investment (cruzeiros)[2]			
Machinery	Cr$ 1,744	Cr$ 5,290	Cr$ 53,160
Livestock	2,376	2,402	3,973
Operating Expenses (cruzeiros)			
Crop	Cr$ 125	Cr$ 910	Cr$ 13,502
Custom hire	19	248	943
Machinery	170	547	5,980
Livestock	107	205	504
Wages	95	100	1,225
Other	385	324	2,460
Total operating	901	2,334	24,614
Income (cruzeiros)			
Farm receipts	Cr$ 2,619	Cr$ 3,950	Cr$ 41,963
Non-farm income	695	929	5,358
New credit	765	894	29,310

[1]Farm size groups are based on quantity of land used for agricultural purposes and include pasture and cultivated land.

[2]In 1969 one cruzeiro was approximately equal to $.25.

Table 2

Investment, Expenses and Income Per
Cultivated Hectare - 225 Specialized Crop Farm
Southern Brazil - 1969

Characteristic	Unimodal Small Farm Region (0-19.9 hectares)	Bimodal Farm Size Region	
		Small Farms (0-19.9 ha.)	Large Farms (50-199.9 ha.)
	(Cruzeiros per cultivated hectare)		
Investment			
Machinery	Cr$ 232	Cr$ 563	Cr$ 598
Livestock	317	256	45
Operating Expenses			
Crop	17	97	152
Custom hire	2	26	10
Machinery	23	58	67
Livestock	14	22	6
Wages	13	11	14
Other	51	34	28
	120	248	277
Income			
Farm receipts	349	420	472
Non-farm income	93	99	60
New credit	102	95	330

Source: Table 1

In view of the rather substantial capital use differences it is significant to note that credit use is quite similar on small farms in both regions. On the other hand large farmers use more than three times as much credit per cultivated hectare as the small farms, and their annual new credit obligation exceeds total operating expenses. Thus, it would appear that the general economic environment surrounding substantial increase in growth on large farms has resulted in some filter-down-effect to the small farms of the bimodal region in the use of technology and capital. Credit policy, however, has not resulted in an equitable distribution of funds. In fact, relative to expenditure levels, small farms in the bimodal region have received the least amount of credit, while the neighboring large farms the greatest amounts. This will be discussed in more detail later.

Major investments and sources of finance

Three major categories of investment are examined for the five year period 1965-69. They are land and building improvements, including new buildings, machinery purchases and land purchases. Summary data is presented in Table 3. Land rental, an alternative form of controlling capital is also considered (Table 4).

Land and building investment are quite similar for each of the small farm groups. Large farms have somewhat more. Savings is the principal source of financing for these modest investments in both regions and again small farms in the bimodal region use the smallest amount of formal credit.

Machinery purchases account for considerably greater investment outlays in the bimodal area, especially on larger farms. Again, the pattern of little credit use by small farmers and substantial quantities by larger farmers is apparent in the bimodal area. Small farms finance a little more than one-fifth of machinery purchases with formal credit, while larger farms

Table 3

Major Investments in Land, Machinery, and Improvements Per Farm 225 Specialized Crop Farms - Southern Brazil - 1965-69

Investment Category	Total Cash Value Per Farm	Source of Financing		
		Savings	Formal Credit	Other
	(1969 cruzeiros)		(percent)	
Land and building improvements				
Unimodal small farm region	Cr$ 1,977	72	20	8
Bimodal region				
Small farm	1,940	86	6	8
Large farm	3,475	80	13	7
Machinery purchases				
Unimodal small farm region	529	50	45	5
Bimodal region				
Small farm	6,236	77	22	1
Large farm	39,690	26	63	11
Land Purchases*				
Unimodal small farm region	980	80	--	20
Bimodal region				
Small farm	1,555	74	14	12
Large farm	7,442	83	10	7

*Does not include initial farm purchases, but represents additions to existing units.

Table 4

Changes in Land Ownership and Rental
213 Specialized Crop Farms
Southern Brazil, 1965-69

Land Category	Unimodal Small Farm Region	Bimodal Region	
		Small Farm	Large Farm
Number of Observations*	(103)	(33)	(77)
1965		(average per farm)	
Land owned	21.8	23.0	66.7
Land rented (net)	-.1	2.9	8.8
Total land operated	21.7	25.9	75.5
Accumulations 1965-69			
Land purchased	1.8	2.7	19.1
-Land sold	-2.2	-.6	-2.7
Net accumulations	- .4	2.1	16.4
1969			
Land owned	21.4	25.1	83.1
Land rental (net)	.3	-7.0	33.9
Total land operated	21.7	18.1	117.0
Percent Change in Land Operated 1965-69	--	-30%	+55%
Change due to land accumulation	-2%	8%	+22%
Change due to land renting	+2%	-38%	+33%

*Twelve farms that initiated their farm operation after 1965, were omitted from this table. The averages reported here, include only those farms in the sample for the full five year period.

use credit for over sixty percent of machinery investment costs. Small farms in the unimodal region use formal credit for one-half of their machinery purchases.

Additional land acquisitions are not an important capital investment for small farms in either region. Large farmers however have made substantial investments in land thus increasing the size of their farm operations. Parcels of added land are generally small and financed principally from savings or current income. Land rental has contributed markedly to increasing size of farm operation on the larger farms, while small farms in the bimodal region have given up land control and decreased size of operation by renting out land to others, presumably to the larger farms (Table 4).

The large farms, in this five-year period have increased their effective control over land resource by 55 percent. Net accumulations of additional ownership have accounted for 22 of the 55 percent, the remaining 33 percent comes from increases in land rental. Conversely, small farmers in the bimodal region have decreased amount of land control by 30 percent. Ownership increased slightly (8 percent), however, a 38 percent loss in land use control was experienced through renting out land to others. In the unimodal area no significant change in land control is noted for the five year period.

One may assume that the direction of change of use of rental property has gone from the small to the larger farmers in the bimodal area. But from where did the purchased land come? We know that it was acquired generally in small parcels, and that much more was purchased than sold by the larger farms. Existing small farmers, those interviewed, have not made significant sales of segments of their property over this time period. This would lead one to speculate that many of the incremental purchases by larger

farmers represent liquidations of small farm operations. If this is true then it would appear that favorable growth policies in the bimodal area have put severe stress on the survival of small farm agricultural there.

Policy considerations

The hypothesis that general national policy has differential growth impact on small and large farmers can be substantiated in several ways. In addition, the impact on small farmers may be quite different depending on whether they are part of a unimodal or bimodal system. For example, the bimodal farm area is making greater use of new technology and farm investments principally in crop inputs and machinery. Within this area, however, large farms are using these items with somewhat more intensity than small farms. The unimodal area shows considerably less progress in the use of these items. It would appear, that the greater economic activity generated in the bimodal region by large farm growth in capital use has had some positive filter down impact on smaller farms. The reasons are several. A general increase in volume of business and number of supplier firms has increased the breadth and efficiency of their services. Major machinery investments by larger farms result in some excess capacity which can be used for custom work on neighboring small farms. A general climate of use of new technology is undoubtably more conducive to experimentation by the smaller farms. These same conditions have not been present in the unimodal region, consequently small farms there exhibit less employment of new technology, both in the present composition of inputs and in investments made in the previous five years.

These findings suggest the need for location-specific development programs designed to meet the unique needs of small farmers, especially in the bimodal area. What form might these take? Mosher [7], in discussing

the integrated program approach, argued for programs that were limited both in geographical scope and to elements not already present and reasonably effective in the area. Several possibilities are apparent. The development of new technologies that are specifically designed for small farmers or at least scale neutral is one. For example, current emphasis on large scale mechanized technology and associated practices is of limited benefit to the small farmer of the unimodal region. At the same time, incentives for wheat production have been largely absorbed by large scale mechanized agriculture. It is likely that timing of critical tasks in wheat production requires some form of mechanization, harvesting for example. Thus, availability of small scale machinery may allow small farmers to participate more fully in this program.

The development of fertilizer responsive varieties is another technological improvement that would be scale neutral, and beneficial to small farmers especially if developed or adapted to soil and climatic conditions of the sub-region. While this is a general need throughout Brazilian agriculture, care must be taken to include small farm regions in the expanding research program.

Incentive programs that are designed to limit the degree of individual farmer participation and insure broad regional distribution are another means of providing growth potential to small farmers. The limited success noted in spreading credit use is an example of this approach.

Development of the necessary institutional facilities to serve farmers is another area of concern. In the bimodal sub-region, the private sector responded rapidly when the economic environment at the farm level was positive for growth. Will the same be true for the unimodal areas or will

special institutional incentives be necessary?

Location specific programs will help to create the necessary environment for growth in small farm areas. Adequately financing this growth however, may require some additional policy changes. As noted earlier, the distributional pattern of credit use was very unequal, with the bimodal region receiving substantially more credit. Its distributions within the bimodal region however is highly weighted in favor of the larger farms. In fact, small farms in the unimodal area have fared better than small farms in the bimodal area. Why is this true? It is undoubtedly largely a question of credit pricing, as suggested by Adams et. al. [2]. Low rates of interest coupled with moderate to high rates of inflation result in very low or even negative real rates of interest. Low rates of interest, also lead to low profit margins for the banks. Large farmers, facing attractive investment alternatives in machinery, land and variable inputs are eager to make use of credit resources, especially at low interest rates. With this large demand facing a somewhat limited supply, it is logical for bankers to favor the large, less costly loans.

If bankers are reluctant to loan to small farmers, then why do small farmers in the unimodal region fare better? In this instance it would appear that policies to increase and broaden the supply of credit through mandetory or bank incentive programs are probably responsible for the modest levels of credit use in the unimodal area. Within much of this area the institutions do not have the large farm as an alternative demand for agricultural credit.

The impact of credit policy is thus double edged. The pricing policy (low interest) evidently leads to serious distributional problems, especially noticeable for the small farmer in a bimodal situation, while

policies to foster broad private bank participation have a positive impact for the small farmers in unimodal areas. A restructuring of interest rates more in line with market prices, should reduce large farmer demand, increase bank returns on agricultural credit and thus distribute credit service more equitably among farm groups.

This Brazilian experience adds additional evidence to the complexity of small farmer development problems, and suggests the manner in which general development policies can have differential impact. More information is needed, however, to quantity the magnitude of these problems. For example, to what extent if any are small farmers falling short of optimum application of variable inputs? Is credit shortage a major contributing factor? Are large farms using more than optimum quantities of credit at equilibrium prices? For example, large farmers are presently using considerably more credit than annual operating expenses. Is total credit plus income flow significantly more than cash outlays for operating and investment capital? If true, does "fungibility of funds" result in leakages to the non-agricultural sector, or inflated land values for example, that price small farmers out of the land market and lead to greater concentration of economic resources with large farms. If the answers to these questions are positive, and preliminary research has suggested they are [10-12-13] then one must question the efficiency of present policy instruments for agricultural growth in general and especially for their impact on small farms.

In general, policies that must first saturate the large farmer demand before trickling down to small farmers are inefficient within the bimodal region, and have little impact on small farmers in the unimodal areas.

This would argue for programs with more specific direction toward small farmers and changes in credit pricing policy. In the unimodal area, programs may be regional in nature. In the bimodal area they must be specific to small farms as a special subset of agriculture in the region. In the context of the small farmer program classification discussed earlier, this would argue for more integrated programs that are limited geographically in scope and to elements not already present and reasonably effective in the area.

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